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Research Program on the Organization and Management
of Research and Development

MARKETING AND ENGINEERING STRATEGIES FOR WINNING R&D CONTRACTS

Edward B. Roberts

July, 1965 #128-65

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Marketing and Engineering Strategies for Winning R&D Contracts

by

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Dr. Kantrowitz, Father Joyce, Dr. Vaughn, ladies and gentlemen:

Today's topic, adapting for survival in the defense industries, has been in recent years the subject of much private and public debate. One of the most controversial documents in the continuing exchange of ideas is a widely circulated publication of the locally-based consultants, Arthur D. Little, Inc.[1] Of their conclusions, with which I strongly concur, a keynote is that for assuring survival we are going to have to focus more and more on problems of marketing for research and development and managing research and development.[2] Through increases in the funding and effectiveness of company and government sponsored research and development, corporate and economic growth can be maintained.

Before describing some of my research results on the R&D contract award process, I should like to tell you about a newly elected governor and his aide who were touring the state prison. As they walked through the corridors with the warden, they heard noises off in the distance. Walking closer they realized that the noises were the sounds of laughter. Then, as they got even closer, they heard somebody call out, "Sixty-five!", and there was loud laughter. Someone else hollered, "Thirty-two!", and there was loud laughter again. Then someone called out, "Twenty-five!", but there was dead silence. The governor and his aide turned to the warden and said, "What's going on here? This is the state prison. Why all

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[1]Superscripts refer to entries in the annoted bibliography at the end of this paper.

the laughter?" And the warden explained, "Well, you know, governor. These men have been here a number of years, and it's pretty dreary here. So they tell stories to amuse each other. After a period of time it gets so that they know each other's stories. To get in more jokes during an evening they put numbers to these stories. This way, they can just say the number, and then everybody laughs." This sounded reasonable to the governor but he asked, "What about that guy who called out 'Twenty-five'? There was dead silence." "Well," answered the warden, "that was old Joe--he never could tell a good story!"

Later that week the governor was addressing a banquet, and his aide was sitting beside him. The governor thought that his prison tour would provide an amusing story for the people assembled at the banquet. He got up and started talking about his trip with the warden, and he was coming up to the point of describing the laughter they had heard off in the distance. The governor suddenly stopped short. Turning to his aide with a puzzled look, he asked, "What were those numbers?"

In case you feel the same way at the end of this talk, I should like to begin by telling you my conclusions first, and hopefully you will remember these. Then, if later you forget the numbers on which the conclusions are based, that won't be so bad. Actually, I have only one main conclusion, but I want to develop it for you in two different ways. The conclusion is simply that more than most of you now believe, and more than your firms act as if they believe, the award of research and development contracts is <u>not</u> a case primarily of company proposal preparation followed by government proposal evaluation. Rather, the award of R&D contracts is a case, much more, of person-to-person contact, principally technical contact; person-to-person information exchange; and person-to-person development of confidence and trust. I intend to draw this conclusion for you, and to show you the evidences that lead to this conclusion, in two ways: first, by looking

at government and at the kinds of activities that our research demonstrates underlie the award of government contracts; and second, by looking at industry, and examining the results of research studies that we have conducted on companies attempting to win government contracts. From both perspectives, the government evidences and the industry data, we shall be led to this conclusion about the essentiality of the informal person-to-person aspects of the research and development marketing situation, in contrast with the lesser importance of the formal proposal preparation-proposal evaluation aspects.

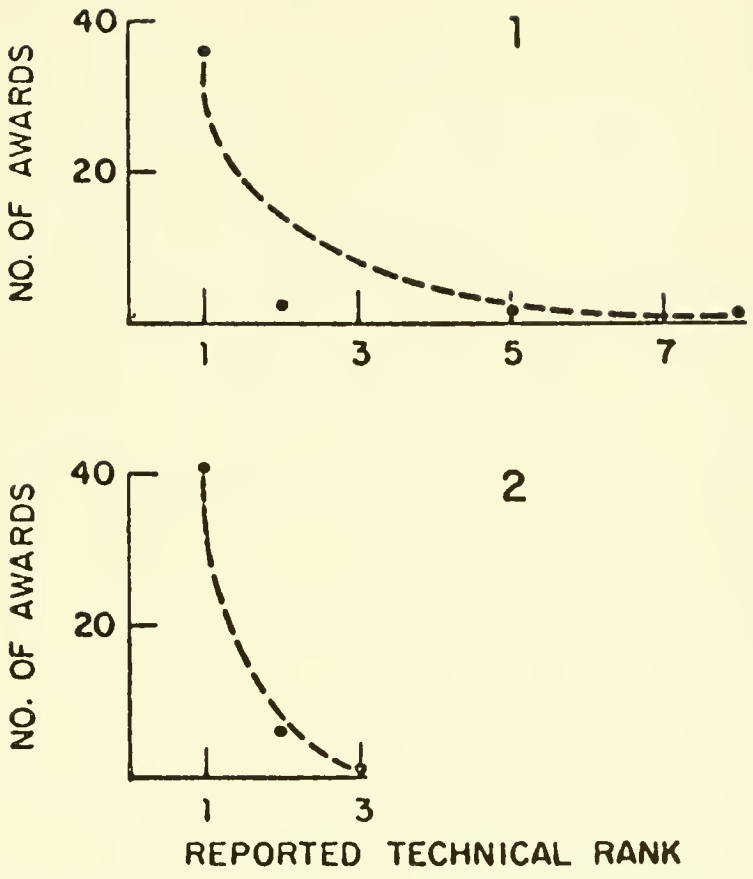
About four years ago, the M.I.T. Sloan School of Management, with the strong encouragement of Mr. James Webb, Administrator of N.A.S.A., determined that it was of major importance that we become more actively involved in research and teaching on the management of research and development.[3] As part of our research program, I started in 1962 a study of the R&D contracting system. The contracting system regulates the principal portion of our spending in research and development in the United States, and it seemed important, both in 1962 and now, to find out what determines the award of R&D contracts, the terms of the contracts, the industry response to the contracting system, and the like.

We started our research with a series of studies of government agencies and their practices in awarding research and development contracts. Thusfar, although we have examined only three large government procuring installations, we are already tiring of finding the same results. With numerous indications from letters, visits, and discussions that the results in other places will not be very different, probably soon we shall draw this phase of data collection to a close.

The research began at one NASA installation where my research assistants and I looked at a series of ten large awards--all above one million dollars in size, with an initial range of one to forty million dollars. (As you might expect, including changes, growth, and the like, that forty million dollar award is now

about 150 millions.) These large contracts were of interest and furnished an informative picture of what happens in the award of R&D contracts. But the situations studied did not provide sufficient quantitative results of the sort that managers of marketing and engineering activities would like to see before drawing conclusions on new company policies. We then turned to two Department of Defense field centers where we attempted to gather more statistically-oriented data, data that I am going to present to you this morning. In the first of these installations we studied forty-one competitions. The competitions resulted in awards of research and development contracts, ranging from $100,000, the minimum award size that we chose to include in our study, up to eight million dollars in size. In this first installation, the awards were made during the period from January, 1960, to June of 1963. Our second study in another DOD field center covered forty-nine contract awards, ranging from $100,000 to in this case $2,000,000 in initial size; and these contracts were in the time period from May, 1962, to June, 1964, the time that we started gathering the data on this last study. Thus our data are drawn from fairly current cases, the latter study reflecting whatever influences the McNamara regime has had on the R&D award process.

The next five figures describe some of the results of these studies. Four of them show data from the two Defense Department organizations, the results of the first installation at the top of the page, and organization two down below. We shall compare the award structure in the two studies on the basis of several different dimensions. In Figure 1 we look at that measure which most people think is the most important in R&D awards, or at least it is the most broadcast as the most important. That measure is the evaluated technical rank of the competitors for an award. What we have done here is to plot a frequency distribution of the award of contracts as a function of the evaluated technical rank of the individual companies receiving the awards. In the first organization, the graph

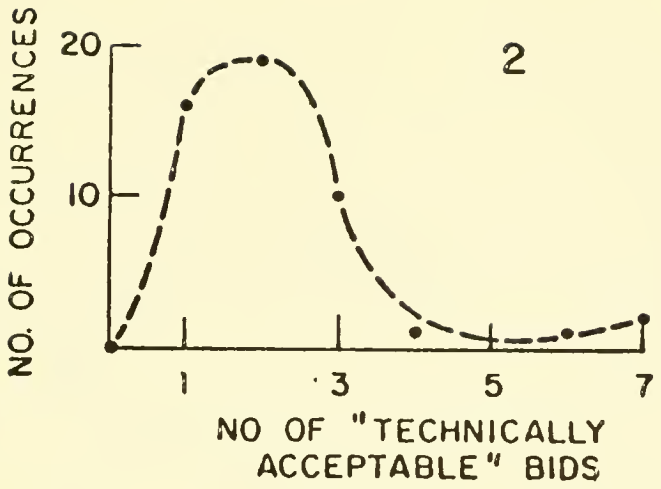


AWARDS AS FUNCTION OF TECHNICAL RANK

Figure 1

indicates that 36 contracts out of the 41 went to the highest technically-ranked company. Two awards went to organizations ranked #two technically, and so forth. In organization #2 where we studied 49 awards, 41 of the awards went to the highest technically-ranked organization, half a dozen went to the second highest ranked, one went to the third highest ranked. The technical rank situation appears to support the general things that everybody says, that in research and development it's the technical evaluation that counts. Let me urge you, however, not to draw your conclusions faster than I draw mine.

As you see from Figure 1 not all the awards go to the highest technically-ranked company. Some of the awards are going elsewhere. There must be some reason, and, "Of course", you say, "cost certainly comes into the picture." But let us find out what happens before cost can enter the picture. Figure 2 illustrates the workings of the process of technical acceptability evaluation that comes in between looking at technical rank and looking at cost. The second agency that we examined was committed to the notion of first qualifying proposals for technical acceptability and not wasting time examining the cost proposals of any firm that was not technically acceptable. The same people who did the technical evaluation determined technical acceptability, of course. The chart of Figure 2 demonstrates that out of the 49 awards that we looked at, in 16 cases only one company was regarded as technically acceptable. After each such determination, the award was quite clear--it either went to that "acceptable" company or the job would be cancelled. We are looking at jobs that were all awarded, so here are 16 cases out of 49 in which only one company survived technical assessment. Going further, there are 19 cases in which two companies survived the technical assessment and were regarded as technically acceptable. This now gives 35 awards out of 49, about 70% of the awards, in which the procurement officer could consider no more than one or two companies. The next point on the curve represents an additional ten cases in which three companies were technically acceptable. Thus

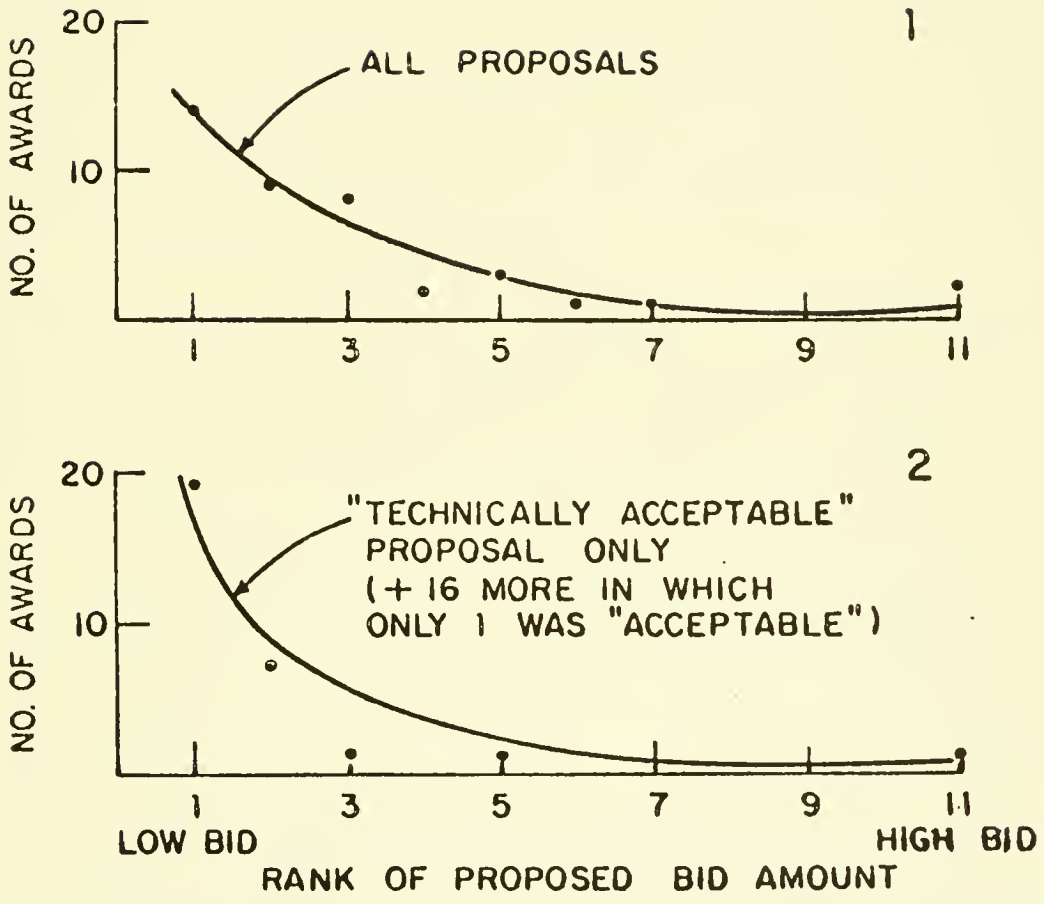


FREQUENCY DISTRIBUTION OF NUMBER OF "TECHNICALLY ACCEPTABLE" BIDS

Figure 2

in 45 out of 49 award cases, better than 90%, following the technical evaluation no more than three companies were possibly in the running for the award of the contract. You see from these data the power of the technical evaluation situation as determinant of who is going to receive the award. We shall return again to this point, that it is the power of technical evaluation that you should remember in considering marketing strategies to be adopted for winning research and development contracts.

We find in Figure 3 what happens when the award winners are ranked on the basis of their cost positions, looking at how much each bid relative to his competitors for the award. It is important to note that all the awards were either CPFF, CPIF, cost reimbursable or cost sharing in some sense, that is in no case was there a formal incentive for a low bid. There were no fixed price competi-

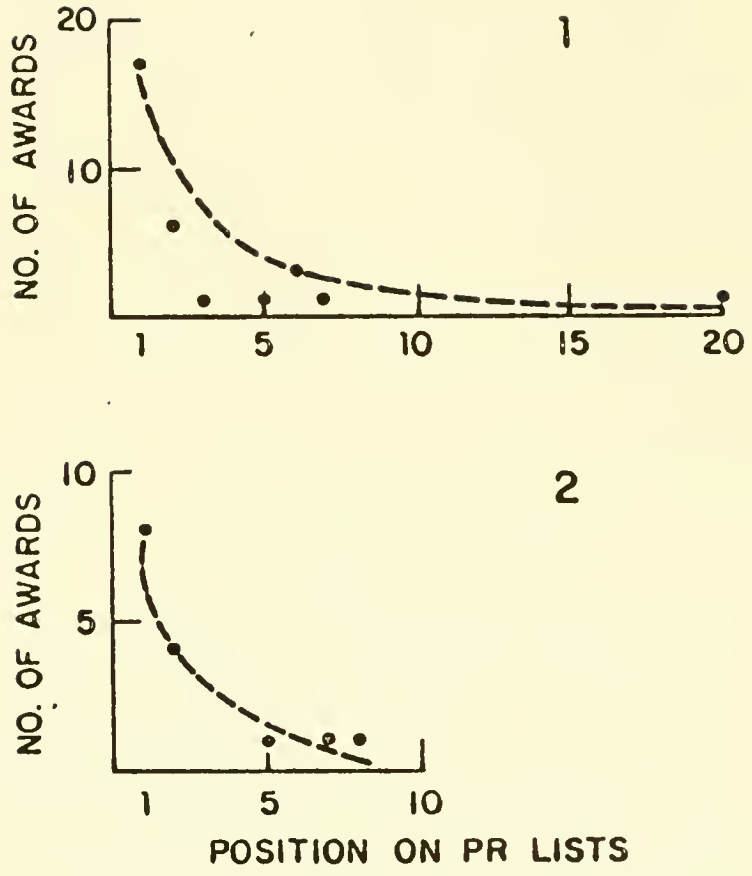


AWARDS AS FUNCTION OF BID AMOUNT

Figure 3

tions in all of our 90 awards, and as you well know, the cost growth that takes place in cost-plus contracting is sufficient to wholly distort any initial bids that are presented. Yet we still get this perhaps surprising picture, that looking at all the proposals in organization #1 (even those that were not technically qualified) and in organization #2 at the technically acceptable proposals (cost data was not kept on file for those not regarded as technically acceptable), the low bidder received more awards than any other bidder. This shows up even though for the second group studied I dropped the sixteen cases in which only one company was ranked acceptable. (I did not know how to treat that one company, as a high bidder or a low bidder.)

These results still do not fully explain the R&D award process. However, we first had technical evaluation determining so much, and secondly, cost evaluation apparently explaining much of the rest. But there is one catch. All of these formal evaluations, of course, occur after proposals have been solicited, after proposals have been prepared, after proposals have been received by the government agency. But things do take place even before these phases. And one of the things that takes place before proposal solicitation, preparation, receipt, and evaluation is that the technical initiator in the government agency prepares a procurement request (PR) on which he indicates among other things a list of suggested companies he has in mind for doing the job. In our research studies we went to this source of data, the procurement request forms in the government files, and we produced the results shown in the next figure. We have plotted for both agencies the frequency of awards as a function of the winning company's position in the list of suggested companies on the procurement request form, made up by the technical initiator six months to a year prior to the evaluation of proposals. We have excluded any alphabetical lists, because we do not believe that a company



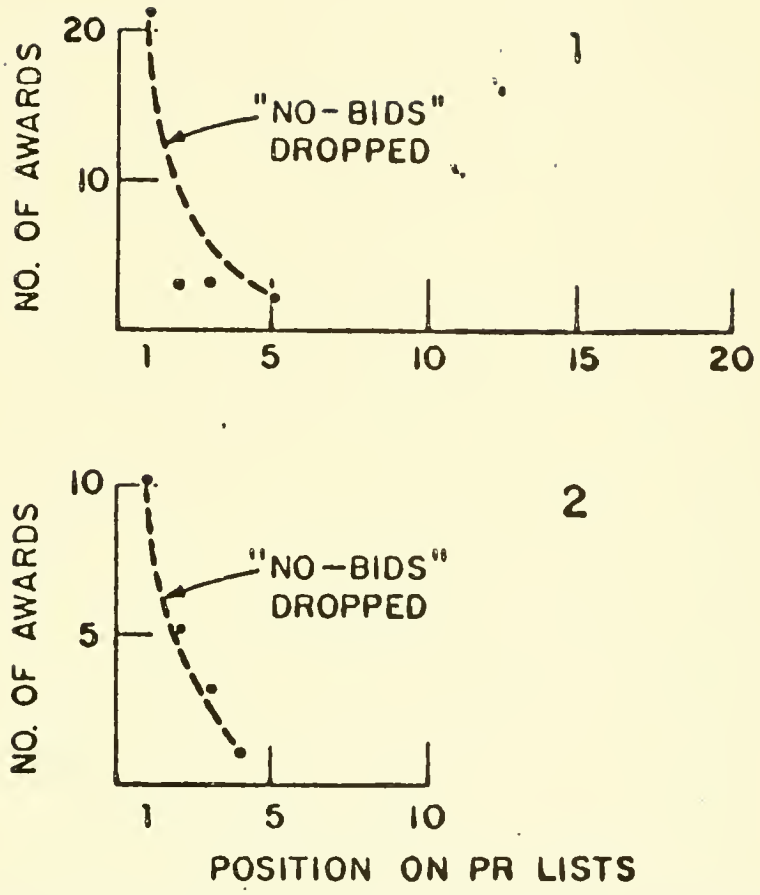
AWARDS AS FUNCTION OF PREFERENCE INDICATOR ON PR LISTS

Figure 4

name beginning with "A" is more favorable than one starting with "Z" for getting government business. (I must admit, however, that a recent study that I have conducted of spin-off companies from the M.I.T. Instrumentation Laboratory shows that 70% of the twenty-eight spin-off firms have names starting with "A" through "D". But we shall assume that alphabetic position is not a prejudicial factor.) Looking at these non-alphabetical cases, we make a very simple hypothesis--that where a firm's name appears on this list prepared by the technical initiator is a good indicator of the initiator's preferences. When we plot, as in Figure 4, the award of contracts as a function of listed position on the PR form, we find that indeed the data support this hypothesis in both organizations.

We can take one more step with our data. If a company preferred by the technical initiator and so listed, did not bid (there appear to be numerous slips of this sort), it is obvious that this preferred company could not win. Revising the lists by dropping these no-bidders, and looking at the frequency of awards as a function of those who were listed and did bid, we produce the sharper curves of Figure 5.

The key question is, "Are the indicators shown in Figures 4 and 5 important?" Our answer is obviously, "Yes!" The data shown here are drawn from procurement request forms that precede by six months to a year the technical evaluation measures shown in Figure 1. It is almost always the government engineer or scientist who prepares the list incorporated in Figures 4 and 5 who also prepares the evaluations that produce the set of technical evaluation curves. Whatever produces the technical prejudice, the feelings of confidence and trust in one particular organization rather than in another, that is built into the initiator at the time that he prepares the procurement request, seems to stick with him throughout the entire formal competitive process. It is apparent that if you want to win research and development contracts, you win by competing prior to



AWARDS AS FUNCTION OF PREFERENCE INDICATOR ON PR LISTS

Figure 5

the preparation of the procurement requests, not during the period of time of formal proposal solicitation, proposal preparation, and proposal evaluation. The proposal solicitation, preparation, and evaluation are responses to a decision by the technical initiator to undertake a set of technical acts under contract. It is clear that he generally enters into that set of acts already committed, at least in his own mind, to one or two companies.

Let me relate some anecdotal information as to the kinds of things that some technical initiators do when they are thwarted in their attempts to award the contracts to the companies that they technically prefer. As you well know, not every attempt to issue a sole source award results in a sole source contract. There are a large number of contracts that are awarded by formal competitive processes after the technical initiator has tried very hard to make a sole source justification. One example copied exactly from an RFP in our sample of contracts demonstrates the case of the angry initiator who was not allowed to go sole source. He wrote the RFP so that of the twelve solicited firms, only Company A, the "favored sole source company", would bid. A few selected lines from the RFP might provide clues to why none of the eleven other solicited companies bid. To quote, "This will require that the bidder, in order to qualify, need have a minimum of successful experience with Doppler equipment identical with that developed and operated by Company A." You don't have to be Company A; you only have to have the same experience that it has! Here is another quotation from the same work statement. "Note: Experience comparable with that shown in the Company A XYZ studies and major subsequent ionospheric studies will be considered satisfactory." Thus, if you had all the same experiences as Company A and you were really familiar with their equipment, there is a good likelihood you could proceed and bid on this contract.

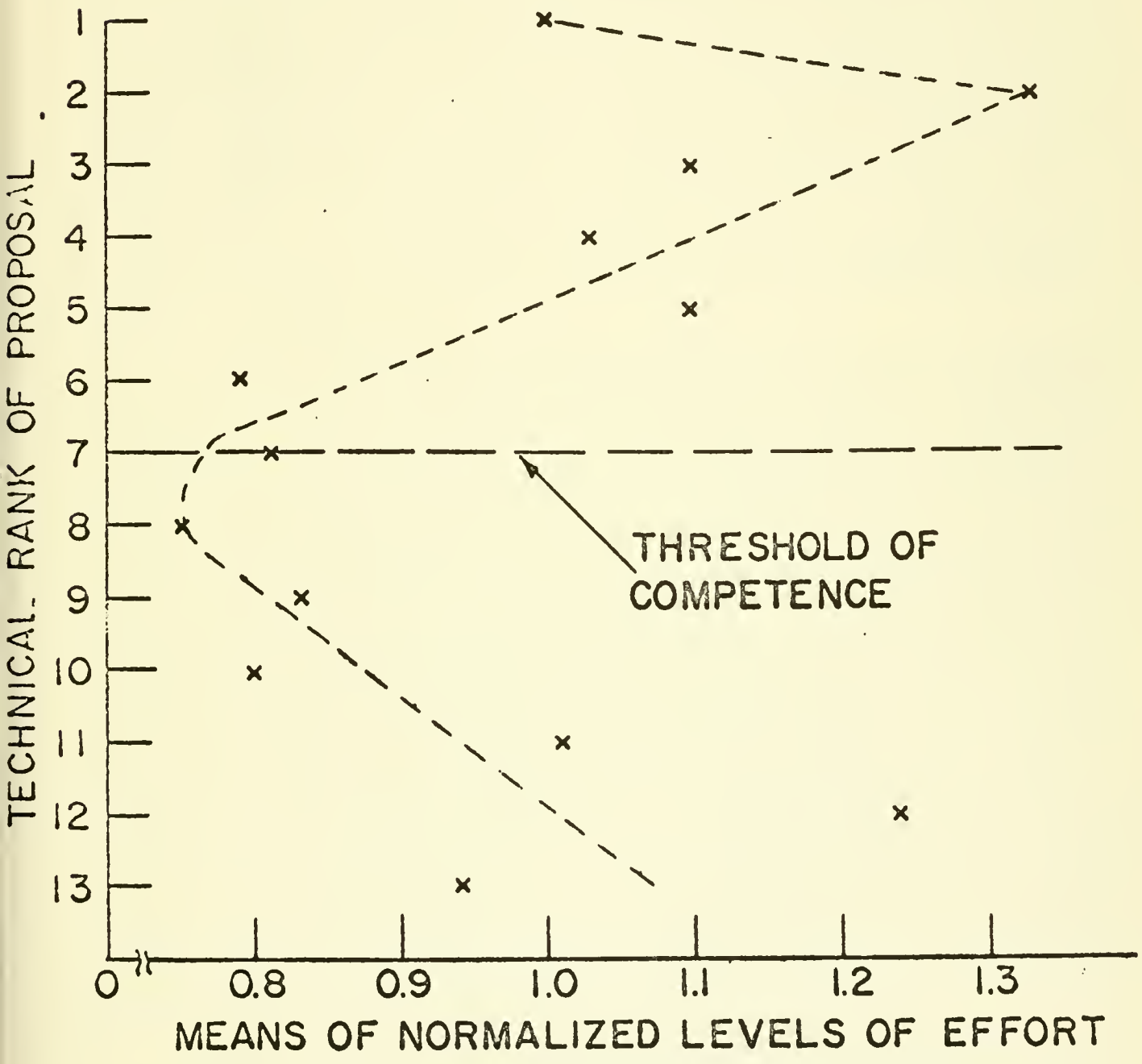
We can provide numerous other examples of certified testimony or extracts from official government files covering the contract awards in our studies. In one award case the procurement officer said during our interview that the initiator

was sold a bill of goods by Company X. Company X, needless to say, got the award. In another case, "Company Y had worked with the people who had prepared the work statement, the initiators, had previously done a feasibility study and obviously had an inside track." Company Y got the award. Quoting from a third case, "The M agency had quite a bit to do with the selection of the recommended sources and the evaluator might have been able to have justified a sole source," according to the procurement officer. The recommended source, needless to emphasize, got the award. Says the procurement officer on another award, "Company N could have been made the sole source." Company N got the award. In still another case, Company Z was requested as sole source, but the request was refused. Company Z got the award. And again our interview records state: "Agency K wrote the specifications and was the major participant in the evaluation. Agency K had a predisposition towards Company R." Company R got the award.

We can repeat similar occurrances time and time again. We can cite not only subtle approaches, but in some cases really malicious approaches by the technical initiator to make sure that his opinion would not be thwarted by the formal practices of procurement. These government technical people are not risking their jobs because of political pressure or due to any graft or corruption reasons. They act this way because at the time they are ready to go out on contract, they are truly convinced that one or two particular companies are the companies to do this work, that no other company could carry out the work as well for the good of their program objectives and for the good of the government. They fear that the formal procurement mechanisms are going to halt them from being able to award the contract to the organization in which they have confidence.

Before finishing this aspect of discussion, I should like to describe some interesting results that have come from a study being done at M.I.T. on the determinants of technical effectiveness.[4] Using data from twenty-two R&D contract

competitions, the researcher has graphed the average effort for all the bidders receiving a given technical rank. Figure 6 illustrates these results, #1 being the highest technical rank. In general, the data produce a U-shaped curve, in-



LEVEL OF EFFORT VS. TECHNICAL RANK
(22 R&D PROPOSAL COMPETITIONS)

Figure 6

dicating that if a company is above some threshold level of competence, putting in more proposal effort results in a higher evaluated technical position. Below this threshold level of competence, putting in more effort apparently demonstrates company ignorance more clearly. But the one main exception to this U-shape is the company ranked #1 technically, who usually is the winner of the award. As you can see, the #1 technically-evaluated firm puts less effort on the average into the proposal than its #2, #3, #4, and #5 technically-ranked competitors. Our own results provide the reasons for this curve. The #1 technically-ranked company is not competing primarily by means of proposal competition. It is competing largely through the pre-selling efforts that have been addressed to the technical organization in general. This pre-selling has caused the company to be ranked #1 technically.

In closing this phase of discussion I shall make one comment in passing. Two months from now, at the Office of Naval Research Conference on Research Program Effectiveness, I intend to examine the cost/effectiveness of this R&D procurement system that so often seems to necessitate six to eight months worth of formal proposal preparation and competition by industry, apparently for little or nought.[5] There is grave doubt in my mind that we should be straining and stressing so much these formal procedures that our Secretary of Defense tells us produce cost savings every time we instigate them farther in the Department of Defense. Our research evidences suggest the counter-conclusion that the formalization of research and development procurement procedures, where informal understandings already exist and where personal commitments have been made (at least mentally if not orally), adds great expense and probably diminished effectiveness to our nation's R&D efforts.

Let me now turn to a very different source of evidence, resulting from the research we have carried out as backup to our government studies. We decided

to try to get better industry information on the R&D award process. In the second government organization studied, we prepared a listing of all of the companies involved in all of the contracts in our sample. (Actually, we excluded three contracts because we did not have total information on all the firms involved.) Two-page questionnaires were mailed to all companies directly involved in any way--solicited but no bid, solicited but no response, bid and lost, bid and won--on 46 awards studied in the second agency, a total of approximately 1200 companies. We have now received useable replies from about forty per cent of these companies, including about 55% of the winners, and have begun to process some statistical analyses of these replies.[6]

The results analyzed confirm first of all that there are great distinctions between bidders and no-bidders. As we look at those companies that were solicited but no-bid, we can make additional comments on the cost/effectiveness of this government procurement situation. Clearly the no-bidders in the 46 research and development awards examined were not really related to the situations under contention. If we compare the no-bidders knowledge, their experience, their prior contact with the customers, etc., against the data from the companies that bid, bidders are shown to be grossly different from no-bidders (statistically significant at the 1/10 of 1% level). The aggregate of no-bidders do not know the initiator, they have not done prior work for him or his group, have not submitted unsolicited proposals in the area, they do not know the funding, they did not anticipate the RFP, they did not have contact with the government technical people, they thought the job belonged to somebody else, they did not think the job belonged to them. In fact, they did not even know who their competitors might be. On every dimension examined, the no-bidders are "out of it". This class of no-bidder companies in research and development procurements is a pecu-

liar class generated by the procurement process. They do not exist in and of themselves, they are generated, as if we had a machine (perhaps a tabulating machine in the procurement office) that created something. These companies, called no-bidders after the fact, have the characteristics of not knowing a thing about what is going in the particular award situation. Yet, of course, the presence of such uninformed no-bidders changes a sole-source award to a competitive procurement, the kind our Secretary of Defense says saves money. The no-bidder firms may be very knowledgeable in other cases, where their persistent interest would earn them an invitation to participate. But in the cases they no-bid, their little knowledge of the contract background appears fit for a group whose names were drawn from a hat, even though we know that the process of soliciting potential bidders is more rational than such a random draw. Or is it?

Let us look at the companies that are somewhat more interesting, the winners and the losers. What distinguishes between these two groups? I shall indicate several classes of distinction that give you the kind of profile you should be aiming for in your own companies if you want to move more often out of the loser category into the winner circle. The results will be presented in two forms: (1) the straightforward percentile responses that you all can understand immediately; and (2) a statistical significance level, a measure of confidence in the results. The significance level is the probability that similar results might have been produced somewhat randomly, without real differences existing between the winners and losers. When the significance level is 10 per cent, for example, a 10 per cent probability exists that the data might come from groups with similar and not different characteristics. You may wish to focus on either one or both sets of measures.

In presenting these data outcomes I shall proceed somewhat in a time series, beginning with the environment preceeding the RFP and going up to proposal submittal. One of the questions on our two-page questionnaires was, "Had your firm performed contract work for this technical initiator (or his group) prior to the issuance of the R.F.P.?" 61% of the winners said "Yes", while only 34% of the losers had had prior contract experience with the group awarding the given contract, a two to one difference in results that is statistically significant at the 2% level. We also asked about submittal of prior unsolicited proposals in the same technical area. Again the factor of a two to one difference between winners and losers shows up, with 32% of the winners having prior unsolicited proposals against only 15% of the losers. These results, however, have a probability level between 10 and 20 per cent, far less significant statistically than the contract work figures. On the question of anticipation of the R.F.P., most of the bidders did anticipate it in contrast to most of the no-bidders' lack of anticipation. But even here there is a distinction between the winning and the losing bidders, with three fourths of the winners but only half the losers expecting the R.F.P. (significant at a level between 10 and 20 per cent).

One interesting pair of questions related to the possibilities that the award appeared "wired" for a particular organization. We asked first, "Did the procurement appear to 'belong' to someone else?" Only 8% of the winners thought the job belonged to another firm. In fact, they were probably right but a reversal later occurred because of a unique proposal or more simply because the preferred firm did not bid. But 24% of the losers, a difference of three to one relative to the winners' responses, thought the job belonged to someone else yet they still bid. Thus one out of every four losers went into a competition that was believed to be rigged and, of course, lost! (These results are also significant at the 10 to 20 per cent level of probable occurrance.) Going one more

step we asked, "Did it appear to 'belong' to your firm?" 36% of the winners but only 9% of the losers said, "Yes", a difference of four to one that is statistically significant at less than the 1% probability level.

We asked the bidders for other assessments of how they felt and what they did about the R.F.P. "Was contact established with the customer's technical personnel (who were responsible for this procurement) following receipt of the R.F.P. but prior to proposal submission?" This act is very often illegal under the Armed Services Procurement Regulations (ASPR), yet apparently it is also often performed. 50% of the winners did it as opposed to 30% of the losers, statistically significant at only the 10 to 20 per cent level. 70% of the winners, versus 45% of the losers, said they "had an advantage over a hypothesized company of equal technical competence whose knowledge of customer requirements was limited solely to information contained in the R.F.P." These results occur in the 10 to 20 per cent significance range. Finally, in the same vein we asked the respondents to indicate how high in the customer's priority scale they believed the procurement to be. The winners regarded the situations as higher in priority, i.e. more likely to result in an award, etc., than did the losers, the difference in their answers being highly significant, at the 2% level of probability of occurrance.

Let me now turn to a set of three questions on the proposal preparation phase. Question 13 on our mail questionnaire queried: "Was the technical approach of your proposal in any way designed to satisfy known technical preferences of the customer?" 68% of the winners knew and responded to technical preferences of the customer but only half as many, 33%, of the losers so acted. This difference is statistically significant at between the 1/10 of 1% and the 1% level of probability, a highly significant characteristic difference. Next we asked, "Was the proposal content specifically directed toward particular individuals?" Again

the empirical results showed a two to one difference between winners and losers, significant in the 10 and 20 per cent range. 28% of the winners directed their proposals at particular individuals while only 14% of the losers similarly behaved. All of these results support the notion that prior contacts are crucial to the award process, manifested in the winners' answers to these two questions. As a final point we also asked, "Did the proposal team contain a member whose principal organizational responsibility was technical writing?" 16% of the winners used technical writers as part of the proposal effort, but 36% of the losers, over twice as many, used them, these results occurring at the 10 per cent level of statistical significance. It appears that if you felt you needed a technical writer to help beef up your proposal, you were probably in bad shape competitively. It is not the proposal effort and proposal writing that wins the contracts; it is what takes place beforehand.

I should like to briefly mention another source of information on company strategy and effectiveness in winning R&D contracts. In addition to the data just cited from several hundred mail questionnaire returns (and our analyses of these data have just begun), we have also gathered information from a series of intensive interview-oriented company studies of marketing and engineering decision-making in R&D. This approach, now revised to a form that can be self-administered by cooperating companies without the expense of long interviews, is being used for a comparative study of medium-to-large New England electronics companies. In each study we work with the company to establish a representative sample of twenty to forty bid-no bid decision situations in the past year or two. Then we gather the data and attempt to determine the correlates of success and failure in the firm.

Let me relate the results drawn from one of our pilot studies in which we have been debugging our research approach.[7] The organization studied called

itself a research laboratory but engaged in both research and development contracts. A number of significant answers were obtained throughout the company's sampled cases. First, and perhaps obviously, whether or not the R.F.P. was anticipated correlated highly with win or loss. Second, frequent customer contact correlated very significantly, at the 2/10 of 1% probability level, with the organization's win record. A third question asked, "Did the company feel it was <u>not</u> at a disadvantage relative to its competition?" A very high positive correlation with success was obtained with results of that question. "Did the company direct the technical solution of the problem to the particular organization?" Again we found a very high significance level correlating with the awards. The last evidence I shall cite is another slant on the proposal effort data indicated earlier in Figure 6. We checked whether or not the company's proposal effort in dollars amounted to less than 1% of the award price. This answer correlated at the 3% significance level, a highly potent result, with the awards to the company. If the firm spent less than 1%, it tended to succeed; if it spent more than 1%, the company tended to lose. Why? We doubt that the extra expenditures hurt the company! Rather, we believe that in general if the company felt it had to spend more on the proposal effort, it probably should not have been in the situation in the first place. Thus, the size of the proposal effort was a sign of company insecurity about its chances of winning.

Let me now draw from our research results some conclusions for marketing and engineering strategies in the R&D field. The conclusions are relatively simple. If in fact the award of research and development contracts is dominated by face-to-face, person-to-person contact, technical exchange, confidence development, then those are the things you have to take into account. What kinds of specific things can you do?

First, in making bid-no bid decisions, think about the underlying factor of face-to-face, person-to-person confidence development. If you have not been in on the pre-R.F.P. phase of the procurement, begin by saying, "We should probably no-bid this R.F.P., unless this is an exceptional situation in which overall strategy reasons cause a bid." But, in general, you should expect to lose the award unless you are confident that you have been into this particular customer's organization in advance contact with the technical people. You ought to feel that you have established a good relationship with the technical group issuing the R.F.P. Don't ask the first question that so many companies ask. In a number of our studies we found that companies first ask, "Do we have technical competence in this area?" That is a relevant question to ask, but it is not the correct first question. You should first inquire, "Have we demonstrated whatever technical competence we have to the particular organization that has issued this R.F.P.?" If you have not yet engaged in "competence demonstration", start off with a black mark on your record, and see if you are so exceptional in other regards that you can overlook this black mark. Remember that you will probably lose the contract if you bid on a job in an area where you have not yet persuaded the customer of your competence.

The second area that we ought to treat as important is the area of engineering budgeting. Too much of the engineering budget intended for generating new business is going into proposal preparation. Much less engineering time and money should be put into formal proposal preparation. It should be diverted to in-house research, research publications for in-house and external circulation, and engineering travel. Get the engineers out of the laboratory when they have something to sell, and get them to the guy who eventually is going to be the customer. You will not make the government technical man your customer, unless the engineer has had an opportunity to present himself and his ideas and his competence to

the customer, in the customer's organization, in a technical exchange.

What is the role of marketing in all of this? The role of marketing in the field office is not primarily to be friendly with the government secretaries nor to be able to read upside down so that you know which R.F.P.s are coming out. Be friendly with the secretaries, if you wish. Also know which R.F.P.s are coming out, but know this in order to advise your organization that an area seems to be picking up in business potential. This does not say that your firm should bid on these discovered R.F.P.s. It suggests that your company should start generating some competence in the area. When your company later has something worth selling, by that time the field marketing man should have established contacts with the government technical organization and should understand who is doing that kind of work and who is interested in the work. The field marketing man should be trying to make sure that his firm's technical people get a chance to see, know of, and be known by those government technical people in their own fields. Perhaps six months after such initial contacts it may be possible to generate the unsolicited proposal or the informally unsolicited proposal that is the preferred sole source situation leading to the R&D awards discussed here. In the home office the marketing man should fight to educate his organization to the points of view preached above, and should use whatever veto power he can muster to enforce the set of resulting policies.

The evidences shown this morning should have demonstrated that these are the facts of the R&D business. Whether or not the business is conducted in the way it ought to be is an entirely separate question. My personal opinion is that the research and development contracting business ought to be far more open in this regard. I do not believe that we should have as much phony formal competition as we do. I think that technical men in government should be more free from fear of artificial rules and regulations, and from interference by unknowing

people. But I think that in your situation as marketing managers in industry, you ought first to recognize what are the facts, and I am convinced that these are the facts.

Annoted Bibliography

1. Discounting the public relations statements of corporate executives and the potential changes arising from increasing conflict in southeast Asia, most knowledgeable people agree with the findings of Strategies for Survival in the Aerospace Industry (Cambridge: Arthur D. Little, Inc., 1965). Of particular interest to marketing and planning staffs are the ADL ten-year projections and the section on new techniques for long-range planning.

2. Further published work by the author on the subjects of R&D marketing and project management are: "How the U.S. Buys Research", International Science and Technology, September, 1964, and The Dynamics of Research and Development (New York: Harper and Row, Publishers, 1964).

3. The resulting M.I.T. organized effort is the Research Program on the Organization and Management of Research and Development, now supported by funds from the National Aeronautics and Space Administration, the National Science Foundation, the Ford Foundation, and the Alfred P. Sloan Research Fund. The latest published description of the program is in: Edward B. Roberts, "Research on the Management of Technology-Based Enterprises", IEEE Transactions on Engineering Management, September, 1964.

4. Thomas J. Allen, "The R&D Proposal Preparation Process: Factors Influencing Technical Quality" (unpublished manuscript, M.I.T. Sloan School of Management, July, 1964), p.8.

5. The planned paper, "Questioning the Cost/Effectiveness of R&D Procurement Process", is scheduled to be published in a book of conference papers that should be available in late 1965.

6. The first set of these results, based on a nearly complete sample of replies, is included in a thesis by one of my graduate research assistants, Lewis G. Pringle, "An Investigation of R & D Marketing Strategy" (unpublished Master of Science thesis, M.I.T. Sloan School of Management, 1965).

7. Two pilot studies of the approach are reported in a thesis by one of my graduate research assistants, Laurence B. Berger, "Comparative Analysis of R & D Marketing Strategy" (unpublished Master of Science thesis, M.I.T., Sloan School of Management, 1965).

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